

Method and System for Generating Fully-Textured 3-D Models

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Abstract

A 3D modeling system for automatically generating fully-textured 3D models of objects from a sequence of images taken around the objects is disclosed. There are several processes developed to facilitate the operation of the 3D modeling system by an ordinary skilled person. One of the processes is the automatic calibration of a camera using only a portion of a calibration disc to essentially provide a larger effective field of view of the camera. Another process is a space carving process that subdivides volumetric cells recursively to fit to a 3D object using a tree structure that encodes the entire process. Still another process is a 3D mesh model generation process that begins with the tree structure and generates self-constraint and interconnected triangles, in a sense that all triangles intersect with each other either not at all or at common boundary faces, to represent the shape of the 3D object. Yet still another process is a textured patch process that provides a useful mechanism for a user to edit and modify a fully-textured 3D model in a desired manner by the user.